Semantic priming across speakers and listeners of Latino varieties of English

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Abstract

We examine how the variation present in a Latino variety of English spoken by Miami-based Cuban Americans, which is not a foreign accent, affects processing for two distinct listener populations, General American English listeners and LA-based Mexican American English listeners. Past research has appealed to notions of standardness and familiarity when explaining processing costs associated with foreign and regional accents. Studying two listener populations that have different relationships with standard and Latino varieties of English has the potential to disentangle these factors (i.e. familiarity, standardness). Through three semantic priming experiments, which measure online processing, it's shown that the variation present in Cuban American speech does not affect priming facilitation for General American English listeners or LA-based Mexican American listeners, suggesting that our human processing system is generally flexible at accommodating variation and that it's worth studying the effects of variation at levels beyond the extremes.

Keywords: variation; processing

Introduction

Research on the perception and recognition of accented speech often studies variation through two categories: native regionally-marked accents or non-native foreign accents (eg. Munro & Derwing, 1995; Floccia et al., 2006; Goslin et al., 2012; Frances et al., 2018). These types of accents highlight gross mismatches between listener and accented talker speech patterns, which contribute to the large number of processing costs associated with *variation*. Anecdotally, though, communicative breakdowns are not common when we communicate with speakers of other accents. By studying varieties and listener populations that are not easily classified as regional or foreign, we can begin to tease apart issues of familiarity and standardness.

Studying Latino varieties of English, which are spoken variably across the US by Hispanic/ Latinx populations, allows researchers to formulate questions about how linguistic experience (ie. familiarity) and notions of standardness affect recognition across listener groups. Latino varieties of English are particularly well suited for these questions because they are non-standard varieties spoken with different linguistic repertoires by Hispanic/ Latinx native English speakers across the country (eg. Thomas, 2019; Podesva et al., 2016; Shousterman, 2014; Newman, 2010; Mendoza-Denton, 2008; Slomanson & Newman, 2004; Wolfram, et al., 2004; Poplack, 1976; Wolfram, 1974).

The linguistic heterogeneity across Latino varieties of English means that those who are familiar with one variety might be capable of identifying speakers of their familiar variety, but not necessarily other varieties. For example, while high rates of syllable timing (where syllables consistently have similar durations; unlike English, where syllable duration correlates with syllable stress) and a TRAP/TRAM merger (where the "a" vowels are pronounced the same; "a" isn't raised and fronted before nasals) have been documented as features of both "Miami English" (Carter et al., 2020; Enzinna, 2015; Carter et al., 2014) and LA-based Chicano English (Santa Ana, 1991; Fought, 2003), these two varieties differ in that some Chicano English speakers have a more fronted /u/ (which is canonically the most backed vowel) because of Chicano speakers' participation in the California Vowel Shift (Fought, 1999). In sum, Latino varieties of English are prevalent in the US, share some linguistic features but vary in others, and are distinct from regionally-marked or "heavy" foreign accents.

Studying Latino varieties of English thus has the potential to help tease apart the contribution of factors like familiarity and standardness that affect processing. This study investigates the effects of variation found in the speech of Miami-based Cuban Americans (CA) on recognition by General American English (GA) listeners and LA-based Mexican American (MA) listeners. While CA speech has distinct features compared to both GA and MA varieties, there are a few reasons to expect spoken word recognition should proceed unimpeded. Specifically, facilitation could occur because listeners have familiarity or exposure to the community, because the human processing system is generally flexible at accommodating variation, or because the variation present in this variety is not as extreme as that found in heavy foreign accents.

The semantic priming paradigm is used here because has been shown to be highly sensitive to subtle phonetic variation (e.g., Sumner, 2013). In addition, many previous studies showing that accents impeded processing relied on offline tasks (eg. Bradlow & Bent, 2008; Munro & Derwing, 1995; Lev-Ari & Keysar, 2010), but the online semantic priming paradigm ensures

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stereotypes about speakers don't influence responses (e.g., Smith & Levy, 2011).

Within this paradigm, there are reasons we might expect to find no or reduced facilitation of semantically-related words. For one, some work has found processing costs for casual spoken English (e.g., Tucker & Warner, 2007; Pitt, 2009). In addition, we know atypical voices slow lexical access (Johnson, 2006). If these effects were to hold for this Latino variety of English, facilitation could be reduced, since semantic priming strongly depends on prime processing speed (van Orden & Goldinger, 1994). These experiments were designed to help us understand whether variation associated with any accented speech is costly, or whether only particular extremes of variation affect processing. By considering two listener populations (GA and MA) with different levels of familiarity with CA variation and different relationships with standard varieties, we can also disentangle the effects of standardness and familiarity on processing more broadly.

In Exp. 1, we replicate past results with GA talkers and GA listeners to validate the online setup. In Exp. 2, we investigate the semantic priming of that same listener population (GA) to CA talkers. And in Exp. 3 we extended Exp. 2 to include LA-based MA listeners. Together, these experiments were designed to elucidate how a CA Latino variety of English affects processing across different listener populations.

Experiment 1

The goal of Exp. 1 was to validate a robust laboratory finding in an online setting. The robustness of the semantic priming effect, its sensitivity to phonetic variation, and its speeded responses should capture any costs that might be associated with the variation introduced by the Miami-based CA talkers. For this first experiment though, only GA talkers and listeners were used to ensure the online experimental setup replicates past work.

Methods

Participants 100 MTurkers were recruited to take this study. Participants who were not native English speakers were excluded, along with participants who scored less than a 90% accuracy for lexical decisions and participants who took longer than 2.5 standard deviations from the mean amount of time to complete the experiment. Because the semantic priming paradigm was run online, as opposed to in person at a lab, the accuracy exclusion percentage was set high at 90% to exclude participants who were not paying attention throughout the experiment—attention is especially important for semantic priming tasks. For this reason, and because of the preponderance of bots on MTurk, many participants were excluded for low levels of accuracy. 40 participants remained after the exclusion criteria were applied. Of these 40 participants, 3 were Hispanic/ Latinx participants who identified Mexico as their heritage country, but these 3 participants were not from LA or Miami.

Stimuli & Design Stimuli were recorded remotely by two GA speakers. One talker produced the primes and another talker produced the targets. The use of two talkers was intended to increase variation for the listeners and also to eliminate any effects that might be due to an individual talker (see Sumner & Samuel, 2009 for a related discussion). The two speakers were selected from a larger group of potential speakers for their acoustic similarity. Speaker A, who uttered all the primes, is a white monolingual GA speaker who has lived in multiple states in the Northeast. Speaker B, the speaker of the target words, is a white monolingual English-speaking male from Chicago, IL. A post experimental survey based on the speakers reading six words revealed that 95% of listeners considered Speaker A to be white and 90% of listeners considered Speaker B to be white.

The stimuli used in the experiment consisted of 320-word pairs, 80 of which were critical semantically-related prime-target pairs (e.g., prime – target), and the rest of which were filler trials (80 with real word targets, and 160 with pseudoword targets). Prime and target pairs were selected based on a word association task. Prime-target pairs that had an associated strength (probability) between 0.3-0.6 and that didn't have a second strong associated word were used.

The 80 critical trials were split into two lists such that in one list, 40 of the primes were paired with semantically related targets (critical trials), and 40 of the primes were paired with semantically unrelated targets (control trials).

The remaining trials were either the 80 filler semantically unrelated prime-target pairs, or the 160-filler real-pseudoword prime-target pairs. The proportion of semantically related trials was 12.5% to reduce the likelihood of strategic responses. Syllable lengths of filler trials were matched to the syllable ratios of the words in the critical prime-target pairs.

Procedure

The study was run online. Each participant read consent and general study information and then tested their audio. Before the task began listeners read task instructions and practiced lexical decisions with two prime-target pairs. Following these practice trials, participants heard the 320 prime-target word pairs in a randomized order. Each pair consisted of the auditory prime, followed by a 100ms ISI, and then the auditory target. After participants made a lexical decision, the next prime was played 1s later, unless no decision was made, in which case the next prime played 3s after the

onset of the prime. After presentation of the 320 trials, participants filled out a post experimental survey about the speakers and a demographics survey.

Results

Individual responses were excluded if lexical decisions were made faster than 500ms from the onset of the target or if lexical decisions took longer than 3 standard deviations from the average response time. A mixed effects linear regression model predicting log RT from the fixed effect of priming condition (semantically related vs. semantically unrelated) and random by-subject and by-item intercepts and slopes revealed a main effect of priming condition ($\beta = -0.07$, $SE = 0.009$, $t = -8.47$, $p < .001$). Response times for semantically related targets were significantly faster than response times for semantically unrelated targets.

These results proved that an online semantic priming task was effective in measuring millisecond differences previously captured in lab-based studies (McCusker et al., 1981; Marslen-Wilson, 1980). As expected, Figure 1 shows semantically related targets were identified as real words significantly faster at 423ms than semantically unrelated targets at 489ms on average. In other words, semantic priming was detected in this online remotely-run experiment.

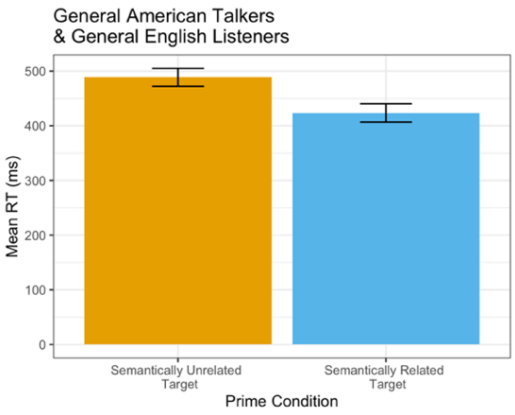

Figure 1: Mean response times to targets preceded by unrelated (yellow) and related (blue) words.

The response times over the course of the experiment in Figure 2 also replicate results found in lab-based studies (eg. Clarke & Garrett, 2004) where listeners get better and faster at experimental tasks with experience. Response times for semantically related targets start out at floor, so they don't decrease significantly over the course of the experiment. In contrast, listeners adapted to the GA speakers' voices over the course of the experiment—response times to unrelated targets decrease over the course of the experiment.

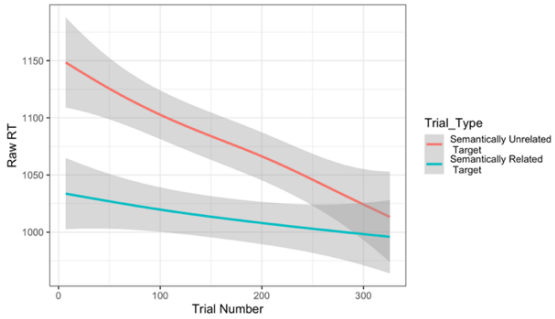

Figure 2: Response time by trial number for semantically related (blue) and unrelated (red) trials

Experiment 2

Exp. 1 replicated the basic semantic priming effect as expected—listeners recognized targets preceded by semantically-related primes ("doctor" - "nurse") faster than words preceded by semantically unrelated primes ("apple" - "nurse"). Exp. 2 used the same listener population (GA) and design as in Exp. 1 with one change: prime and target words were spoken in a Latino variety of English by two CA from Miami, FL.

The purpose of this experiment was to determine whether words preceded by related words are recognized faster by GA listeners than those preceded by unrelated words when spoken by a CA who speaks a Latino variety of English. On the one hand, we might hypothesize that any variation will impede processing because of evidence that even subtle variation within GA English can be costly and evidence that atypical voices slow lexical access. If these kinds of effects hold, we'd expect either significantly reduced priming or a null effect. On the other hand, if listeners are generally flexible at accommodating variation, we'd expect to find facilitation.

Methods

Participants 100 MTurkers participated in Exp. 2. Once again, participants who were not native English speakers were excluded, along with participants whose accuracy was less than 90% and participants who took longer than 2.5 standard deviations from the mean amount of time to complete the experiment. After the exclusion criteria were applied, 62 participants remained. Of these 62 participants, 1 non-Hispanic participant was from Miami, FL, 1 non-Hispanic participant was from Los Angeles, CA, and 1 participant from Texas identified as Hispanic/ Latinx.

Stimuli & Design The stimuli used in Exp. 2 were recorded by two CA based in Miami, FL who were selected from a larger set of speakers for their perceived similarity by trained phoneticians. Speaker A is a native speaker of both English and Spanish. He identifies

himself as Hispanic/ Latinx and his heritage country as Cuba. Speaker B is also a native speaker of both English and Spanish and identifies as Hispanic/ Latinx with Cuban heritage. The CA speakers in Exp. 2 recorded the same set of 320 word pairs as the GA speakers in Exp. 1.

Procedure

The procedure for Exp. 2 was the same as Exp. 1.

Results

The same exclusion criteria for individual responses used in Exp.1 were applied in Exp. 2 as well (individual responses were excluded if lexical decisions were made faster than 500ms from the onset of the target and if lexical decisions took longer than 3 standard deviations from the average response time).

A mixed effect linear regression model predicting log response time from the fixed effect of priming condition (semantically related vs. semantically unrelated) and random by-subject and by-item intercepts and slopes also revealed a main effect of priming condition ($\beta = -0.07,\ SE = 0.009,\ t = -7.8,\ p < .001$). Response times for semantically related targets (427ms) were significantly faster than response times for semantically unrelated targets (483ms).

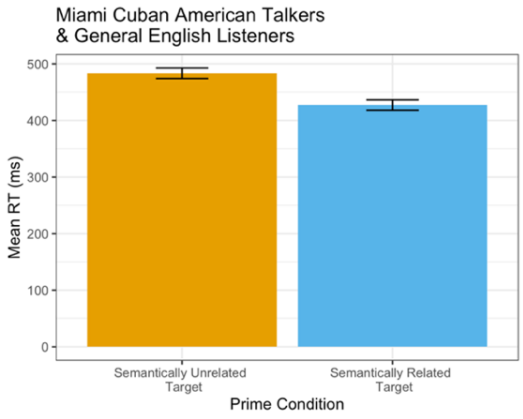

Figure 3: Mean response times to targets preceded by unrelated (yellow) and related (blue) words.

These results show that words produced by CA talkers facilitate recognition to semantically related targets. This effect was robust across CA talkers despite listeners' varying exposure to Hispanic/ Latinx populations (based on responses from the post-experiment demographics questionnaire). These results in combination show that word associations and networks are still being accessed and utilized despite the variation at the acoustic level (Johnson, 1997) and despite the range of exposure to Hispanic/ Latinx populations, which was used as a proxy for exposure to Latino varieties of English.

In addition, response times still decreased over the course of the study as listeners adapted to the speakers, but in a different way than in Exp. 1. While response times to semantically related targets started out close to floor in Exp. 1, Figure 4 shows that in Exp. 2, response times were longer to start. Over the course of the experiment, response times decreased as listeners adapted to the speakers' voices for both semantically related and unrelated words. It appears there was an initial orientation to the speakers, with the priming effect remaining relatively stable. Overall, this graph points to learning and adaptation to the Latino variety of English over the course of the experiment—facilitation was not blocked.

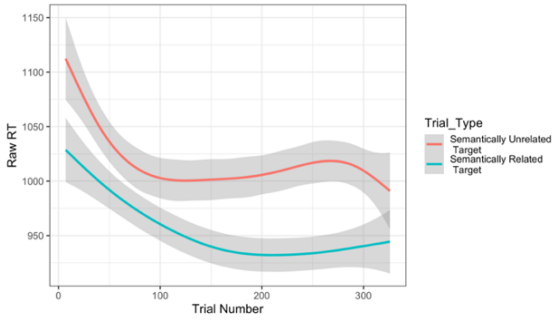

Figure 4: Response time by trial number for semantically related (blue) and unrelated (red) trials

Experiment 1 & 2 Meta-Analysis

Because Exp. 1 and 2 were both run online on MTurk with the same listener population, a meta-analysis was conducted to determine whether there was a difference in facilitation across the two speaker conditions. A mixed effect linear regression model predicting log response time from the fixed effects of speaker condition (GA vs. CA) and priming condition (semantically related vs. semantically unrelated) and random by-subject and by-item intercepts and slopes revealed a main effect of priming condition ($\beta = -0.07,\ SE = 0.008,\ t = -8.8,\ p < .001$) but not of speaker condition ($\beta = 0.04,\ SE = 0.02,\ t = 1.6,\ p < 0.1$). Therefore, facilitation was equivalent across these two experiments despite the difference in talkers groups. Exp. 3 could not be included in the meta-analysis because of the differences across listener populations.

Experiment 3

The results of Exp. 2 suggest that GA listeners readily recognized spoken words and did so fast enough to facilitate recognition to related targets when faced with speech by CA talkers—the priming facilitation effect in Exp 2. is robust (a difference of 56ms). If we take language use and exposure as a proxy for familiarity, we

would expect that the MA listeners in Exp. 3 would also show robust facilitation.

Even though it appears that the effect in Exp. 2 is potentially at floor (especially when compared to the results of Exp. 1), we included the LA-based MA listener population in Exp. 3 for four reasons. First, like the GA listeners, the LA-based MA listeners speak a different variety than the CA talkers. Second, unlike the GA listeners, they are exposed more regularly to variation that's been documented in the varieties spoken by both LA-based MA and Miami-based CA like syllable timing and the TRAP/ TRAM merger (Miami: Carter et al., 2020; Enzinna, 2015; Carter et al., 2014; LA: Santa Ana, 1991; Fought, 2003). Third, they provide an important comparison to GA listeners, offering a better understanding of how a more diverse listener population processes the Miami-based CA speech. Finally, they make up an underrepresented population in research that is specifically relevant to the questions at hand.

Methods

Participants 50 participants were recruited by word of mouth to complete Exp. 3. The same exclusions as Exp. 1 & 2 applied, but in addition, LA-based MA participants were excluded if Los Angeles was not listed as one of their current or previous regions, if Mexico was not listed as a heritage country, and if English acquisition occurred later than age 7. In the end, 32 participants were included in the analysis.

Stimuli & Design While the participant recruitment method differed from Exp 1 and 2, the stimuli and design were otherwise identical to Exp 2.

Procedure

Participants completed the same online lexical decision semantic priming task as in Exp. 1 and 2.

Results

A mixed effect linear regression model predicting log response time from the fixed effect of priming condition (semantically related vs. semantically unrelated) and random by-subject and by-item intercepts and slopes revealed a main effect of priming condition ($\beta = -0.056,\ SE = 0.012,\ t = -4.85,\ p < .001$). Response times for semantically related targets were significantly faster than response times for semantically unrelated targets—MA listeners also experienced facilitation effects when listening to CA talkers.

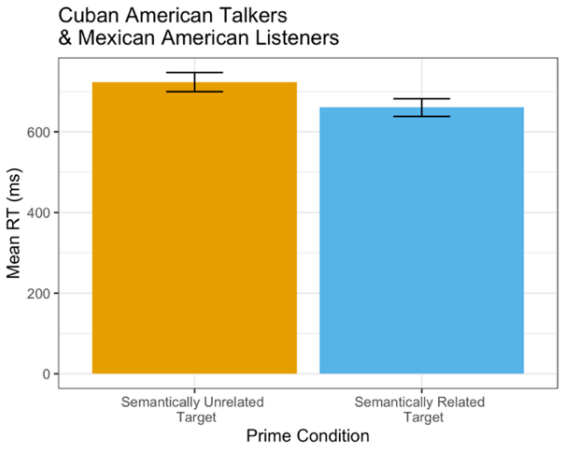

Figure 5: Mean response times to targets preceded by unrelated (yellow) and related (blue) words.

The overall longer response times in this experiment likely result from the fact that the listeners were not MTurkers and thus had less experience with online experiments. Nonetheless, semantic priming was still evident in the difference between conditions' response times. As seen in Figure 5, participants identified semantically unrelated targets on an average of 723ms, compared to semantically related targets on average of 661ms. As expected, facilitation was still found in Exp. 3, showing that variation present in Latino varieties of English do not necessarily pose a challenge to processing for a diverse set of listeners.

The pattern for response times over the course of Exp. 3 is clearly distinct from the first two experiments. However, like Exp. 1 & 2, semantically related targets are also recognized faster than unrelated targets. In addition, MA listeners adapted to the speakers at the beginning of the experiment but in Exp. 3, the difference between unrelated and related targets is less pronounced. This is difficult to interpret, but we speculate about this pattern in the discussion.

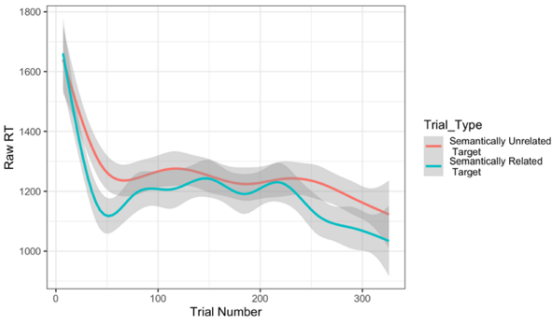

Figure 6: Response time by trial number for semantically related (blue) and unrelated (red) trials

Discussion

This study investigated how variation present in a Latino variety of English was processed by different listener populations: GA listeners and LA-based MA listeners. Exp. 1 tested whether GA listeners recognized semantically related words spoken by GA talkers faster than unrelated controls in an online environment. As in lab-based studies, robust facilitation was found. Exp. 2 investigated the effects of the variation present in CA speech on semantic priming for the same GA listener population. Compared to Exp. 1, facilitation in Exp 2. was just as robust, even though CA speech was not as standard as the GA speech in Exp. 1. Exp. 3 extended the research to include listeners who did not speak the same Latino variety of English but shared some linguistic features with the talkers (MA listeners thus had relatively more familiarity to variation present in CA speech despite not speaking the same variety). In this case, the LA-based MA listeners also recognized semantically related words faster than unrelated words, but behaved differently across trials as seen in Figure 6. Together, these results suggest that facilitation is robust for this Latino variety of English across listener groups (recall a meta-analysis could not be conducted with Exp 3 results because of the difference in listener populations). While the robust facilitation found across all three experiments ultimately did not allow us to tease apart the effects of familiarity and standardness, the results do suggest that unfamiliar variation that deviates from a standard variety does not always result in processing costs. These results thus complicate the picture regarding foreign and regional accents—while notions of familiarity and standardness are often appealed to when explaining processing costs for foreign and regional accents, our results show that listeners are capable of adjusting to some kinds of non-standard and unfamiliar variation quite well.

The robust facilitation for a Latino variety of English in Exp. 2 & 3 at first glance seems at odds with the conclusions of past studies that have found evidence for difficulty processing foreign and regionally accented speech. However, studies that showcase the strongest costs tend to use offline tasks that might promote response biases. In addition, the variation present in this Latino variety of English is distinct from the variation present in heavy foreign accents. Whether this variation poses fewer processing costs or is unassociated with strong stereotypes is beyond the scope of this work but is important to tease apart in future work.

The results presented here add to the growing body of literature that provide evidence for adaptation and accommodation to variation present in both regional and foreign accents, as well as in accents we might not easily identify or classify. We find no evidence to support the line of research that this novel variation is uninformative noise or problematic for listeners. We also find robust facilitation across the two listener populations that differ in their exposure to features shared across these two Latino varieties of English (familiarity) and their relationship to standardness.

The future study of Latino varieties of English has the potential to shed light on the issues discussed above. For this reason, we feel it is important to understand the potential challenges faced by researchers. First, recruiting populations not typically included in experiments, even online, is challenging. These populations don't typically live near institutions, might not have experience working with researchers, and aren't regular online study participants. As such, participants are hard to find, and some are skeptical or wary of the purposes of research. In the future, promising recruitment methods might include in-person recruitment. Diverse populations' physical distance from a lab also makes it hard to include them in our studies, but these populations have the potential to help tease apart longstanding questions in the field (like variation, typicality, exposure, stereotyping, and their effects across a wide array of tasks). Taking the time to travel to the area of interest and engage with the community is time-consuming and expensive but would help overcome the issue of implicit exclusion.

In addition, our results in Exp. 3 suggest that there are large differences across populations that might complicate our findings. While speculative, considering the trial-by-trial patterns in Figure 6, we think that it's entirely possible that communities less experienced with laboratory studies and online experimentation might pattern differently from the GA populations typically investigated. Teasing apart the distinct causes for these patterns is critical, as our goal is to understand human cognition more broadly. These challenges are not a reason for these populations' continued exclusion, but for thoughtful approaches to inclusive research. Studies that involve diverse populations have the potential to address and mitigate societal issues like bias.

The work presented here, for example, could be expanded by including LA-based MA as not just listeners but also speakers and by studying the effects of GA speech on LA-based MA listeners. Expanding the scope of research in this way will address questions in the field like the effects of familiarity and exposure on mental representations and the effects of standardness in speech comprehension. In addition, this line of research will help us move away from binary classifications of accents.

In sum, we found robust semantic priming across our three talker-listener contexts. These results lay the groundwork for future work investigating Latino varieties of English and raise questions relevant to a wide swath of work.

References

Bradlow, A. R., & Bent, T. (2008). Perceptual adaptation to non-native speech. *Cognition*, *106*(2), 707-729.

Carter, P. M., López, L., & Sims, N. (2014). A first look at Miami Latino English: Tracking Spanish substrate influence through prosodic and vocalic variation. *New ways of analyzing variation (NWAV)*, *43*, 23-26.

Carter, P. M., Valdez, L. L., & Sims, N. (2020). New Dialect Formation through Language Contact: Vocalic and Prosodic Developments in Miami English. *American Speech: A Quarterly of Linguistic* Usage, 95(2), 119-148.

Fought, C. (2003). *Chicano English in context*. Springer.

Enzinna, N. (2015). Spanish-influenced prosody in Miami English. *Cornell working papers in phonetics and phonology. Ithaca, NY*.

Floccia, C., Goslin, J., Girard, F., & Konopczynski, G. (2006). Does a regional accent perturb speech processing?. *Journal of Experimental Psychology: Human Perception and Performance*, *32*(5), 1276.

Fought, Carmen. 1999. "A Majority Sound Change in a Minority Community: /u/- Fronting in Chicano english." *Journal of Sociolinguistics* 3: 5–23.

Fought, C. (2003). *Chicano English in context*. Springer.

Frances, C., Costa, A., & Baus, C. (2018). On the effects of regional accents on memory and credibility. *Acta psychologica*, *186*, 63-70.

Goslin, J., Duffy, H., & Floccia, C. (2012). An ERP investigation of regional and foreign accent processing. *Brain and language*, *122*(2), 92-102.

Johnson, K. (1997). The auditory/perceptual basis for speech segmentation. *Talker Variability in Speech Processing*, K. Johnson and J. Mullenix (eds.), 145-166. Academic Press.

Johnson, K. (2006). "Resonance in an exemplar-based lexicon: The emergence of social identity and phonology," J. Phonetics 34, 485–499.

Lev-Ari, S., & Keysar, B. (2010). Why don't we believe non-native speakers? The influence of accent on credibility. *Journal of experimental social psychology*, *46*(6), 1093-1096.

Marslen-Wilson, W. D. (1980). Speech understanding as a psychological process. In *Spoken language generation and understanding* (pp. 39-67). Springer, Dordrecht.

McCusker, L. X., Hillinger, M. L., & Bias, R. G. (1981). Phonological recoding and reading. *Psychological bulletin*, *89*(2), 217.

Mendoza-Denton, N. (2008). Homegirls: Symbolic practices in the making of Latina youth styles. *Maiden, MA: Blackwell*.

Meyer, D. E., Schvaneveldt, R. W., & Ruddy, M. G. (1972, November). Activation of lexical memory. In *meeting of the Psychonomic Society, St. Louis*.

Munro, M. J., & Derwing, T. M. (1995). Foreign accent, comprehensibility, and intelligibility in the speech of second language learners. *Language learning*, *45*(1), 73-97.

Newman, M. (2010). Focusing, implicational scaling, and the dialect status of New York Latino English 1. *Journal of Sociolinguistics*, *14*(2), 207-239.

Pitt, M. A. (2009). How are pronunciation variants of spoken words recognized? A test of generalization to newly learned words. *Journal of Memory and Language*, *61*(1), 19-36.

Podesva, Robert J., Daniel Galbraith, Sunwoo Jeong, Sharese King, Bonnie Krejci, Kate Lindsey, Teresa Pratt, Simon Todd, Casey Philip Wong, and Robert Xu. (2016). A Sociophonetic Study of /l/- Darkening Among Latina/o and European Americans in Bakersfield, California. Paper presented at the Annual Meeting of the American Dialect Society (ADS), Washington, DC.

Poplack, S. (1978). Dialect acquisition among Puerto Rican bilinguals. *Language in society*, *7*(1), 89-103. *processing*, *6*(2), 9-32.

Santa Ana A, O. (1991). Phonetic simplification processes in the English of the barrio: A cross-generational sociolinguistic study of the Chicanos of Los Angeles.

Shousterman, C. (2014). Speaking English in Spanish Harlem: The Role of Rhythm. *University of Pennsylvania Working Papers in Linguistics*, *20*(2), 18.

Slomanson, P., & Newman, M. (2004). Peer group identification and variation in New York Latino English laterals. *English World-Wide*, *25*(2), 199-216.

Smith, N., & Levy, R. (2011). Cloze but no cigar: The complex relationship between cloze, corpus, and subjective probabilities in language processing. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (Vol. 33, No. 33).

Sumner, M. (2013). A phonetic explanation of phonological variant effects. *Journal of the Acoustical Society of America,* 134

Sumner, M., & Samuel, A. G. (2005). Perception and representation of regular variation: The case of final/t. *Journal of memory and language*, *52*(3), 322-338.

Sumner, M., & Samuel, A. G. (2009). The effect of experience on the perception and representation of dialect variants. *Journal of memory and language*, *60*(4), 487-501.

Sumner, M., & Kataoka, R. (2013). Effects of phonetically-cued talker variation on semantic

encoding. *The Journal of the Acoustical Society of America*, *134*(6), EL485-EL491.
Thomas, E. R. (Ed.). (2019). *Mexican American English: Substrate influence and the birth of an ethnolect*. Cambridge University Press.
Tucker, B. V., & Warner, N. (2007, August). Inhibition of processing due to reduction of the American English flap. In *Proceedings of the 16th international congress of phonetic sciences* (pp. 1949-1952).
van Orden, G. C., and Goldinger, S. D. (1994). "Interdependence of form and function in cognitive systems explains perception of printed words," J. Exp. Psychol. Hum. Percept. Perform. 20, 1269–1291.
Wolfram, W. (1974). Sociolinguistic Aspects of Assimilation: Puerto Rican English in New York City.
Wolfram, W. (2007). Sociolinguistic folklore in the study of African American English. *Language and Linguistics Compass*, *1*(4), 292-313.
Wolfram, W., Carter, P., & Moriello, B. (2004). Emerging Hispanic English: new dialect formation in the American South. *Journal of Sociolinguistics*, *8*(3), 339-358.